TOHOKU INSTITUTE OF TECHNOLOGY

電子工学専攻／Department of Electronics

教員紹介／Teaching Staff

職位／Title	氏名／Name	学位／Education	研究内容／Research
Professor	FUJITA Toyomi	Doctor of Engineering	My research interests include the development of robot visual functions based on the human visual scanpath, involving human vision control of eye movement sequences. I have analyzed the scanpath and developed imageprocessing algorithms which showed effectiveness in predicting the scanpath based upon image kernels, the theory of signal detection and others. In the next phase of my research I intend to continue my work in predicting the human visual scanpath and applying its technologies to robot vision so that a robot recognizes the action or intention of partner robots or human to accomplish effective cooperative work and smooth interface.
Professor	ITO Masashi	Doctor of Engineering	We have studied speech perception and acoustic signal processing. Based on psycho-acoustical experiments, a novel perceptual model is proposed which integrates traditional formant-based model and whole-spectral model to explain various perceptual phenomena consistently. For speech analysis, a Local Vector Transform（LVT）has been proposed on the basis of sinusoidal representation of speech signals. The method can be applied to high-quality speech conversion and time-variant transfer function.
Professor	UCHINO Takashi	Doctor of Engineering	Takashi Uchino has been a Full Professor in the Department of Electrical and Electronic Engineering at the Tohoku Institute of Technology since 2011 and has engaged in education and research on optoelectronic devices based on low dimensional materials. Previously, he worked for the University of Southampton, UK, to explore post CMOS devices and photonic metamaterials. He also worked for Hitachi Central Research Lab, where he engaged in research and development of CMOS and Bipolar transistors for mainframe computers and high-end processors. His current research interests include innovative materials, metasurface, optical rectenna, biochemical sensors based on SERS, and non-Si nanoelectronics.
Professor	KASAI Shigenobu	Doctor of Engineering	Development of Microbiochip We have utilized microfabrication technologies and localized chemical reactions at solid surfaces to fabricate integrated biochip and develop characterization methods. We are now going on to apply these biochips to environmental monitoring, health monitoring, diagnosis, drug screening, and order-made medical treatment.
Professor	KARASHIMA Akihiro	Doctor of Information Sciences	Experimental and modeling studies are performed focusing on the role of neuronal activities in sleep on development and maintenance of neuronal circuit. In addition, biomedical signals such as electroencephalogram and heart rate are recorded and analyzed to quantify daytime sleepiness and nocturnal sleep quality.
Professor	KOBAYASHI Masaki	Doctor of Engineering	Study on the technique of ultraweak photon imaging and fluorescence tomography, and its application determining biological function of living body through visualization of gene expression and physiological activity with using reporter gene and quantum dots.
Professor	SHIBATA Kenji	Doctor of Science	Quantum dots are often called "artificial atoms" and show varieties of atom-like physics. Electrical manipulation and read-out of quantum mechanical states in single quantum dots and molecules is expected to bring about innovation in quantum information processing. I have been working on electron transport through single quantum dots by using metallic leads with nanogaps and exploring device applications of novel physics manifested in such systems.
Professor	SHIMOI Norihiro	Doctor of Engineering	I, Dr. Shimoi in Tohoku Institute of Technology researches and develops the principal synthesis of electrical elements with non-metallic material based on environmental studies. My scholarship policy is to create new devices to reduce power consumption for a low carbon society and power saving-based sustainable society. Then it is necessary to establish the scientific technology for the construction of principal electrical elements in order to create the devices. Main themes for my policy mentioned to the followings are my own scholarship, ・Creation of the electrical application employing carbon nano-materials, ・Synthesis and composition, including process development, of an active material in a lithium-ion secondary battery, ・Creation and principle analysis of the bridge formation between ceramics and other materials in nonequilibrium reaction field as a bottom-up architecture.
Professor	SUZUKI Ikuro	Doctor of Philosophy	To understand the function of brain and expand into drug discovery and regenerative medicine, we have developed the electrosensing techniques in human induced pluripotent stem cell derived neurons and 3-dimentional reconstructed techniques of biological tissues.
Professor	TAGAWA Ikuya	Doctor of Engineering	Hard Disk Drive（HDD）, used in Personal Computer and in Video Recorder, is now a central player of Data Center, and is the essential device for Big Data and for Artificial Intelligence. HDD capability has been progressed significantly with Perpendicular Magnetic Recording and Tunnel Magneto-Resistive sensor technologies. We are studying next generation technologies like Microwave Assist Magnetic Recording and Heat-Dot Magnetic Recording for further growth of HDD.
Professor	NAKAYAMA Hidehisa	Doctor of Information Sciences	In the field of next generation high-performance sensing in the IoT society, we research on advanced information processing of IoT sensors and ad-hoc networks.For ad hoc networks, we research on the construction of reliable and secure networks while making use of temporary networks.For advanced information processing of IoT sensors, we are conducting research on analyzing multidimensional information observed and gathered by many IoT sensors using the techonology on machine learning.

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Professor	MIYASHITA Tetsuya	Doctor of Engineering	Electronic display devices used in the smart phone,television, PC, etc. make an important role as a manmachine-interface in recent information society. To supply more information quickly in various scene,I have been focusing on variety of electronic displays devices, and researching on fundamental physics, new optical elements and 3D displays for future-oriented display systems.
Professor	MUROYAMA Masanori	Doctor of Engineering	I have researched sensor system and robot technologies with MEMS-LSI integration and original LSIs. I have focused on tactile sensor network and multi-sensor systems of the next generation robots. However, the technologies can extend for wide range of applications such as medical, sports, human augmentation. With the technologies, we can acquire spatial-temporal high-dense data at edge network and can combine with machine learning for intelligent services.
Professor	ARAI Toshikazu	Doctor of Science	Our laboratory explores quantum condensed states emerging near absolute zero. When thermal motion of atoms is suppressed near zero temperature, unique properties arising from wave nature of matter appear in a macroscopic scale. We are interested in superfluidity of helium, quantum Hall effects, and electronic properties of graphene.
Professor	MIZUNO Fumio	Doctor of Engineering	We have been studying on wearable computing and devices for home health care and medical use. Research topics are described blow. 1. Study on a device providing independent views to both of eyes 2. Developing assistive robots for care giving 3. Development of a wearable computing for vital signs monitoring 4. Study on a man-machine interface using biological signals
Associate Professor	ONODERA Toshiyuki	Doctor of Engineering	Medical imaging instruments have dramatically improved modern medical technology. In this Lab.,compound semiconductors characterized with high atomic number, high density and wide band-gay energy have been studied to realize gamma-ray detectors with high detection efficiency used for imaging devices such as X-ray CT, SPECT（Single photon emission computed tomography） and PET（Positron emission tomography）
Associate Professor	TAKURA Tetsuya	Doctor of Engineering	Recently, in various fields, wireless energy transmission techniques have attracted people's attention. I investigate wireless energy transmission method via electromagnetic induction. My major research topics include design and evaluation method of coil for wireless power transmission（WPT）,development of WPT equipment for EVs on parking and moving, and development of hyperthermia system for cancer therapy comprised of implantable heating device and exciting equipment generating highfrequency magnetic field for heating.